

## LETTERS

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### BETWEEN-BROOD CANNIBALISM IN THE MONTAGU'S HARRIER

Cannibalism has been reported in several raptors. In most cases, it is associated with brood reduction, either following the natural death of a nestling (Lyons and Mosher 1982, *Ardea* 70:217–219; Holthuijzen et al. 1987, *J. Raptor Res.* 21:32–33; Burton 1993, *Aust. Bird Watcher* 15:45), or when siblings or parents have actually killed the youngest or weakest nestling in the brood in periods of food shortage (Newton 1978, *J. Zool. London* 184:465–487; Pilz and Seibert 1978, *Auk* 95:584–585; Baker-Gabb 1982, *Corella* 6:83–86; Bechard 1983, *Wilson Bull.* 95:233–242; Bortolotti et al. 1991, *Can. J. Zool.* 69:1447–1453). Between-brood cannibalism, in contrast, has only been recorded in Black Kites (*Milvus migrans*; Jones and Mañez 1991, *J. Raptor Res.* 24:28–29) and Lesser Kestrels (*Falco naumanni*; Negro et al. 1992, *J. Raptor Res.* 26:225–228).

Feathers and eggs of Montagu's Harriers (*Circus pygargus*) have occasionally been found during diet studies (Hiraldo et al. 1975, *Doñana Acta Vertebrata.* 2:25–55). We recorded several such findings of within-brood cannibalism during a study near Madrid, Spain where we have monitored a population of about 45 pairs of Montagu's Harriers in a 200 km<sup>2</sup> area since 1991. In one case, a foot believed to have belonged to a wk-old harrier was found in a pellet and, in a second case, a freshly dead uneaten nestling and a foot and two wings of three different nestlings, all of them of about two wk of age, were found at plucking perches of four nesting pairs. Plucked feathers of nestlings about 12–15-d-old were found at six other nests. All these observations occurred at nests where brood reduction occurred and the estimated ages of the eaten harriers matched those of the missing nestlings. Thus, we assume that the nestlings had been eaten by their siblings or parents.

Brochet and Gizart (1995, *Alauda* 63:122) observed a case of apparent between-brood cannibalism in Montagu's Harrier when a freshly dead 2-d-old nestling was found in a nest after an aerial food pass from a male to its mate. The nest, visited shortly before the food pass, had contained only a <5-d-old nestling and an egg that was hatching. One egg or nestling was missing since the original clutch size had been three. Thus, the age of the putative prey fitted with that of the missing nestling, as eggs of Montagu's Harriers usually hatch at 1- or 2-d intervals. Additionally, Brochet and Gizart indicated that the nest was a late one and that no other occupied nests were found within 5 km of the nest. Therefore, their observation could be interpreted as a case of within-brood cannibalism. The female may have removed the nestling after it died and cached it in the plucking site as has been observed in other nests in Madrid. The male may therefore have taken the dead nestling from the cache.

Here, we present two observations which took place in our study area near Madrid, confirming between-brood cannibalism in Montagu's Harriers. The first observation took place in 1995 at a nest which was located in the biggest colony that year which contained 15 breeding pairs. On 17 June, the nest contained three nestlings aged 9, 10 and 11 d. The agricultural field where the nest was located was harvested on 20 June, but the three nestlings survived. On 21 June, we observed the female feeding the young the remains of a well-feathered Montagu's Harrier nestling. That nestling had been plucked some 30 m away, where we found other remains including both tarsi. On 22 June, only the two older nestlings were found. The smallest of them had a harrier tarsus in its beak that belonged to a nestling estimated to be at least 20-d-old. On 23 June, we banded the only remaining nestling and, on 25 June, its remains were found after it had been killed by a feral dog. The stomach of this nestling contained remains of three grasshoppers and a Montagu's Harrier foot belonging to a chick approximately 12–15-d-old. We could not be certain where the eaten nestlings originated but the foot in the stomach of the dead nestling could have belonged to one of its siblings judging from its size. It was obvious, however, that the two other dead nestlings found on 21 and 22 June came from another brood. They could not have come from the nearest nest, where the two nestlings died when the field was harvested. We knew of no other nestlings of the same ages that were missing from nearby nests, so the eaten nestlings presumably came from an uncontrolled nest.

The second observation took place in 1996, at a colony of 13 harrier nests that we observed. Remains of a 20-d-old nestling were found at a nest on 7 July when harvesting had begun in the agricultural fields. No partial mortality occurred at the nest, which contained three eggs at incubation and which fledged three young. As in the previous observation, it is not known where the dead nestling came from, as no nestlings of that age were missing from any known nests in the area. It is unclear whether the harriers actually killed the nestlings, ate them as carrion, or took them opportunistically when the young nestlings were found injured following harvesting. It is worth noting that,

among raptors, the three species for which between-brood cannibalism has been recorded (Black Kites, Lesser Kestrels and Montagu's Harrier) are colonial or semicolonial. Between-brood cannibalism might therefore be a cost of nest clumping.

We are grateful to J. King for correcting the text, and to Gary Bortolotti and two anonymous referees for improving the manuscript.—**Beatriz E. Arroyo,<sup>1</sup> Edward Grey Institute of Field Ornithology, Department of Zoology, University of Oxford, South Parks Road, Oxford OX1 3PS, UK; Jesús T. García, c/o Españaletto 5, 28932 Móstoles, Madrid, Spain.**

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#### SCRAP-LUMBER ROOST USED BY BURROWING OWLS (*SPEOTYTO CUNICULARIA*)

Burrowing Owls (*Speotyto cunicularia*) typically use mammal burrows for nesting and roosting. After nesting, they disperse to new areas where suitable roost burrows are available (Haug et al. 1993, *Birds of North America*, No. 61, A. Poole and F. Gill, [Eds.], The American Ornithologists' Union, Philadelphia, PA U.S.A.). The apparent purpose of burrows is for protection from predators and the weather.

As part of a concurrent study of postfledging dispersal in Alberta, Canada, Burrowing Owls were fitted with radio-transmitters south of Regina, Saskatchewan, Canada (50°27'N, 104°37'E). On 20 August 1996, one adult female and two juveniles dispersed from their nest burrow to a new location approximately 800 m to the north. Dispersal of this distance involving the whole family is not uncommon (Haug et al. 1993). The instrumented female was tracked to a field, where she flushed from a haphazard pile of scrap lumber roughly circular in shape (about 1.5 m high × 8 m wide). Adjacent to the lumber pile there were several abandoned cars and trucks. The surrounding habitat included a 1 ha hayfield, 4 ha summer fallow field and 64 ha patch of native pasture where the nest burrow had been located.

On five occasions owls were flushed from the interior of the lumber pile and pellets and feces were also found inside. Once flushed, the owls typically flew less than 50 m to nearby fence posts, some of the cars or they landed on the ground. A search of the area indicated there were no other burrows within 150 m and there were neither feces nor pellets within 300 m of the woodpile. All three owls remained at the lumber pile until 20 September.

Despite the fact that Burrowing Owls nest close to people (Thompson 1971, *Condor* 73:177–192), to my knowledge this is the first record in the Great Plains or Intermountain region of Burrowing Owls using an above-ground, man-made roost. These observations suggest that Burrowing Owls are more flexible in their choice of roosting cavities than has been previously thought.

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